Citation:

Mennella JA, Beauchamp GK. Beer, breast feeding, and folklore. *Developmental Psychobiology*. 1993; 26 (8), 459-466.

PubMed ID: 8293892

Study Design:

Randomized crossover study

Class:

A - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

- To evaluate effects of the consumption of a single serving of beer by lactating women on the feeding behaviors of their infants and the sensory qualities of their milk
- To determine whether the mothers perceived changes in their lactational performance and their infants' behaviors as the result of beer consumption.

Inclusion Criteria:

- Lactating women
- Mother with breastfed infant
- Consumed at least one alcoholic beverage during lactation
- Excellent health
- Non-smokers
- Informed consent.

Exclusion Criteria:

- Non-lactating mothers
- Mothers with infants who were not breastfed
- Mother with no alcohol consumption during lactation
- Poor health
- Smokers.

Description of Study Protocol:

Recruitment

- Recruited from Philadelphia area
- Recruitment methods were not discussed in detail.

Design

- Each mother-infant pair served as both control and intervention groups; alcoholic and non-alcoholic beer, respectively
- Each mother-infant dyad was tested on two days separated by one week
- Half of the women consumed the alcoholic beer during the first test session and the non-alcoholic beer during the second; the order was reversed for the remaining six women
- Baseline sample of breast milk expressed as well as samples at one, two, three and four hours after beverage consumption
- Breast milk odor, milk ethanol content, infant nursing behaviors and mother's perception of infant behaviors were evaluated.

Intervention

Consumption of single serving of beer or non-alcoholic beer.

Statistical Analysis

- Two-tailed tests
- Chi-square analyses with Yates' correction applied for continuity.

Data Collection Summary:

Timing of Measurements

- Mothers' weight measured at visit
- Infant weighed before and after each feeding to determine volume of milk consumed
- Milk samples obtained at baseline, one, two, three and four hours after beverage consumption and evaluated for ethanol contents, odor and volume expressed
- Questioning was conducted at the end of each feeding regarding:
    - Infant's feeding
    - Whether a letdown was experienced
    - If they felt there was milk remaining in the breast at the end of the feeding.

Dependent Variables

- Infants' milk consumption
- Infant nursing behaviors
    - Number of times infant fed
    - Total amount of time attached to the nipple
- Mother's perception of infant's feeding behaviors
- Mother's perception of lactational performance
- Ethanol content of milk
- Odor of milk
- Dose of alcohol delivered to infant.

Independent Variables

Beer intake (single serving alcoholic beer or non-alcoholic beer).

Control Variables

Each mother arrived at Monell Chemical Senses Center at approximately 9:30 a.m. after feeding her infant at approximately the same time each day.

Description of Actual Data Sample:

- *Initial N:* 12 mother and infant (9 girls, 3 boys) pairs
- *Attrition (final N):* 11 mother and infant pairs
- *Age:*
  - Mothers' median age: 31.5 years
  - Infants' median age: 150 days
- *Location:* Philadelphia, Pennsylvania.

Summary of Results:

Key Findings

- Infants consumed significantly less milk during the four-hour testing sessions in which their mothers drank alcoholic beer, compared to the session in which she drank non-alcoholic beer
- There was no significant difference in the number of times the infants fed or the total amount of time they were attached to the nipple between non-alcohol and alcohol consumption groups
- Observed decrease in milk intake was not due to a decrease in the amount of time the infants spent at the breast
- No significant difference in the mothers' perceptions of various aspects of their infants' behaviors or their lactational performance under the two testing conditions
- Analyses of video records revealed no statistical difference in the number of times the mothers terminated the feeds on the two testing days
- Significant alteration in the odor of milk samples for each woman on the day of alcohol consumption
- Ethanol content in the milk changed significantly as a function of the length of time since mothers consumed the beer [$F(28.4)=56.72$, $P<0.001$]
- Small, but significant change in the odor of milk samples obtained from five of the 11 women on the day of non-alcoholic beer consumption
- Amount of alcohol ingested by the infants ranged from 18.6 to 66.7mg (mean=43.1±5.2mg)

	Nonalcoholic Beer Consumption	Alcoholic Beer Consumption	Statistical Significance of Group Difference
Total milk intake (ml)	193.1±18.4	149.5±13.1	P<0.05
Total time attached to nipple (minutes)	20.4±4	26.5±4.8	Not significant
Number of feedings	2.2±0.2	2.1±0.2	Not significant
Mothers experienced letdown (percentage of feeds)	78 (23)	77 (22)	Not significant

Mothers felt baby got enough milk (percentage of feeds)	100 (23)	82 (22)	Not significant
Mothers felt they had milk remaining in breasts at end of feeding (percentage of feeds)	74 (19)	78 (18)	Not significant
Mothers felt like they ended the feed (percentage of feeds)	33 (24)	26 (23)	Not significant

Author Conclusion:

- The consumption of a single dose of alcoholic beer by nursing mothers flavored their milk and decreased the amount of milk consumed by their infants
- The mothers were unaware of the infants' consuming less milk after the alcoholic beer intervention as compared to the non-alcoholic beer intervention
- The mechanism by which the consumption of alcoholic beer by lactating women decreases milk intake by their nurslings remains to be determined.

Reviewer Comments:

Small sample size.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions

1. Was the research question clearly stated? Yes

1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	???
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes

4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	Yes
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	Yes
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	N/A
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	Yes
6.6.	Were extra or unplanned treatments described?	Yes
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes

7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	No
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes